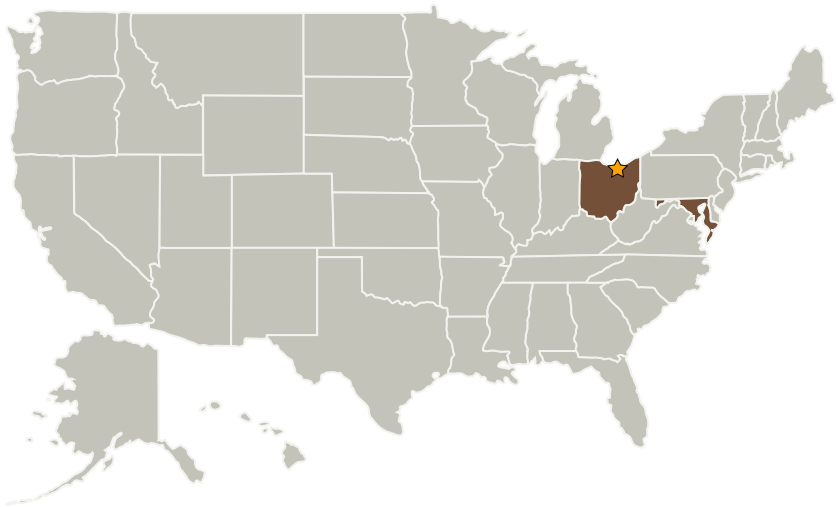
High Temperature, High Frequency Fuel Metering Valve, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

Active Signal Technologies and its subcontractor Moog propose to develop a high-frequency actuator driven valve intended to achieve TRL 6 by the end of Phase II. This active control component will be capable of modulating fuel flow at multiple injection locations with minimum fuel pressure drop and thus enable critical improvements in aerospace vehicle turbine engine combustion dynamics, notably mitigation of thermo-acoustic instabilities. These instabilities have impeded development of advanced lean-burning combustors for reduction of NOx emissions and improvements in combustion efficiency. While passive approaches to control combustion instability have been successful on particular new engine designs, the ultimate solution is active combustion control where the greatest challenges are the bandwidth (1 kHz) and system temperature requirements. The Phase-I goal is to demonstrate that these are achievable by designing and building a proof-of-principle system complete with high-frequency, high-temperature actuator and valve. Active Signal has selected Terfenol as the most suitable actuator material and will apply 25 plus years of actuator, valve and pump experience to meet the goals. The system will be tested against pressure and flow requirements to demonstrate the effectiveness of this approach before fabricating a prototype suitable for the GRC test stand in Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Active Signal Technologies, Inc.	Supporting Organization	Industry	Linthicum, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.1 Integrated Systems and Ancillary Technologies